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ESTIMATED AVERAGE GLUCOSE (eAG) : A MARKER FOR SEVERITY OF ACUTE MYOCARDIAL INFRACTION IN COASTAL REGION KARAIKAL

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ABSTRACT: Individuals who are at risk of CVD(cardio vascular disease) may also have comorbidities like elevated blood pressure, glucose levels, dyslipidemia, obesity etc. Identifying those high risk individuals helps in prevention of premature deaths. So there might be an association between elevated blood glucose levels and overall mortality rate in MI (Myocardial Infarction) patients. So the present study is undertaken to estimate the severity of myocardial infraction with estimated average blood glucose levels. This is an observational study done on 50 patients divided into 2 groups, group 1-patients having diabetes, group2- patients without diabetes of age >18 years who admitted in VMMC, Karaikal coastal area hospital with complaints of STEMI, NSTEMI and unstable angina for a duration of 18 months from July 2021 to December 2022. After admission, detailed history, blood sugar levels, ECG,2D-Echo, were estimated in the patients and it is correlated with the severity of the patient by comparing with GRACE 2.0 scoring. We observed that there is significant relation of GRBS,FBS,PPBS,HBA1C levels between study group and control group with MI. eAG (estimated average glucose)of patients with diabetes to non-diabetic patients it shows that the severity of myocardial infraction is more in diabetics compared to non-diabetics eAG to risk and grace 2.0 scoring in general is statistically insignificant. So further studies are needed to be done prove its association.

INTRODUCTION:

The world is now in the pandemic of non-communicable diseases. Diseases like diabetes, hypertension, cardiovascular diseases are in trend today due to changes in dietary patterns and, work stress, life style modifications etc. Even though familial and genetic factors play a role in causation of disease, modernization has taken a toll on health. About 17.8 million people died from CVD accounting for 31% of total deaths every year, out of which 85% were due to MI and stroke. Individuals who are at risk of CVD may also have comorbidities like elevated blood pressure, glucose levels, dyslipidemia, obesity etc. Identifying those high risk individuals helps in prevention of premature deaths. Diabetes is one such major risk factor having greater influence on vascular tree effecting both microvasculature and macrovasculature. The degree of diabetic complications on vascular system not only depend on variations in glycemic control but also on the duration of the disease. Hyperglycemia is considered as independent risk factor for diabetes. In diabetes there is either inadequate secretion of insulin or there is insulin resistance which results in activation of various inflammatory mediators, resulting in injury to vascular system which triggers atherosclerosis. Hyperglycemia hastens the process of atherosclerosis by formation of glycated plaques products which leads to damage of endothelium resulting in complications. It is estimated that risk of cardiovascular accidents is twice in diabetics compared to normal population. It is observed in other studies that hyperglycemia in Acute coronary syndrome occurs due to activation of adrenergic receptors and raised catecholamine's due to stress. Hyperglycemia may present in MI can be taken as

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a marker of pre-existing undetected carbohydrate metabolism disorders. According to some recent studies that hyperglycemia is overlooked in about 66% of patients admitted with acute MI. So there might be an association between elevated blood glucose levels and overall mortality rate in MI patients. So the present study is undertaken to estimate the severity of myocardial infraction with estimated average blood glucose levels.

AIM AND OBJECTIVES: To measure the estimated average glucose levels in ACS patients and to correlate it with severity of the patient by comparing with GRACE 2.0 scoring system.

MATERIALS AND METHODS:

This is an observational study done on 50 patients divided into 2 groups ,group 1-patients having diabetes ,group2- patients without diabetes of age >18 years who admitted in VMMC, Karaikal coastal area hospital with complaints of STEMI, NSTEMI and unstable angina for a duration of 18 months from July 2021 to December 2022.Patients with sepsis, hypothyroidism, smoking history,>48 hours of admission after symptoms of MI, haemoglobinopathies were excluded from the study. After admission, detailed history, blood sugar levels, ECG,2D-Echo, were estimated in the patients and it is correlated with the severity of the patient by comparing with GRACE 2.0 scoring.

RESULTS:

FIGURE 1: DISTRIBUTION OF PATIENTS IN BOTH GROUPS BASED ON GENDER

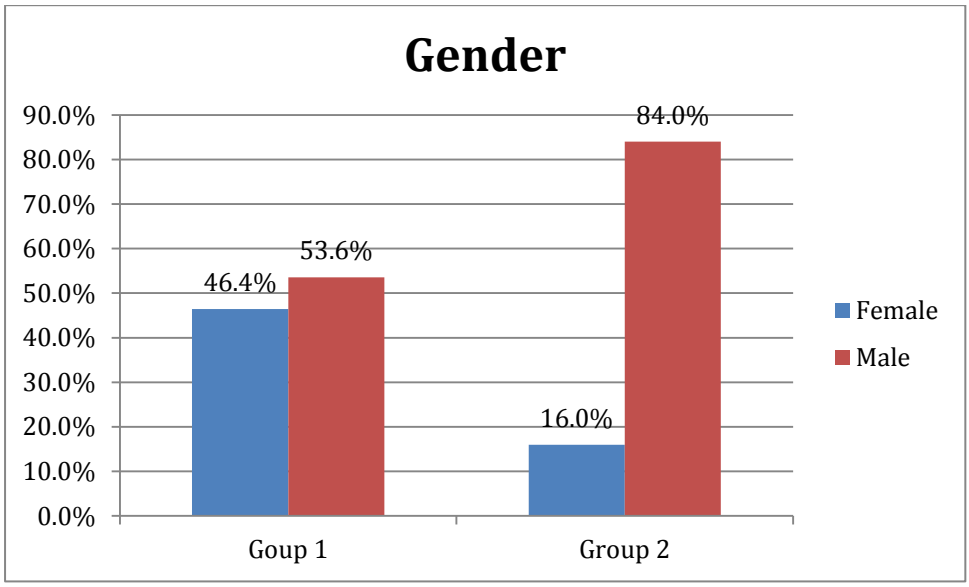

FIGURE 2: DISTRIBUTION OF PATIENTS IN BOTH GROUPS BASED ON CHESTPAIN

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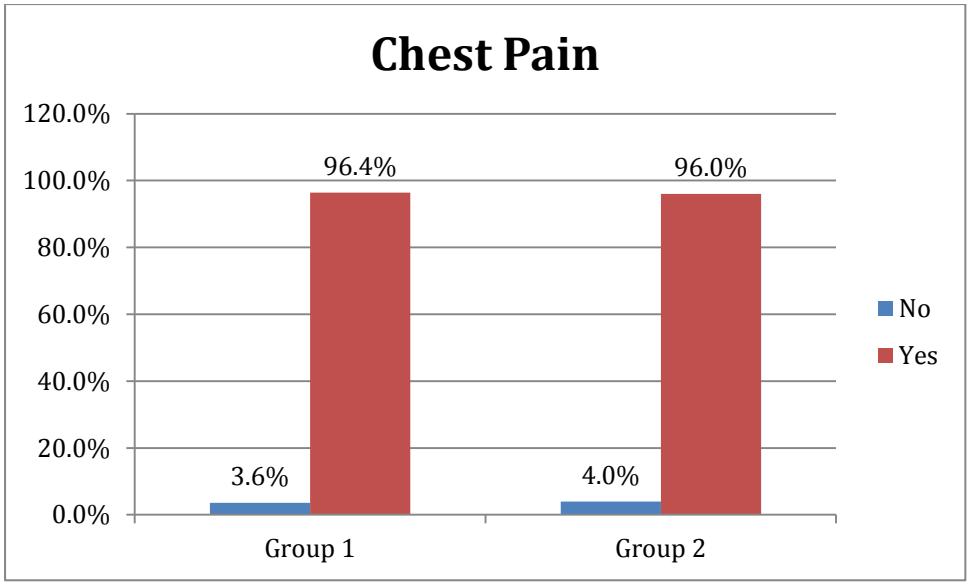

FIGURE 3: DISTRIBUTION OF PATIENTS BASED ON OLD CAD

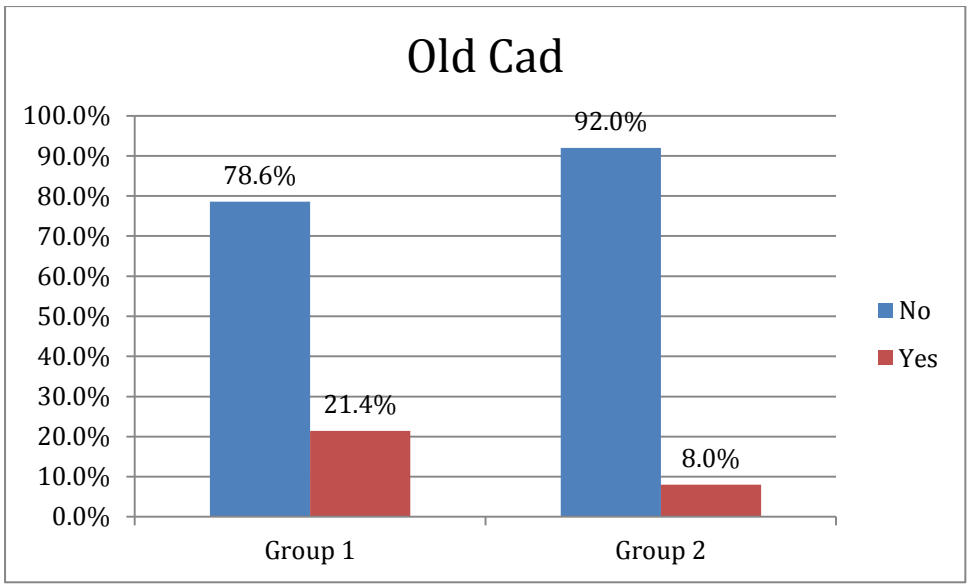

FIGURE 4: DISTRIBUTION OF PATIENTS BASED ON CABG DONE

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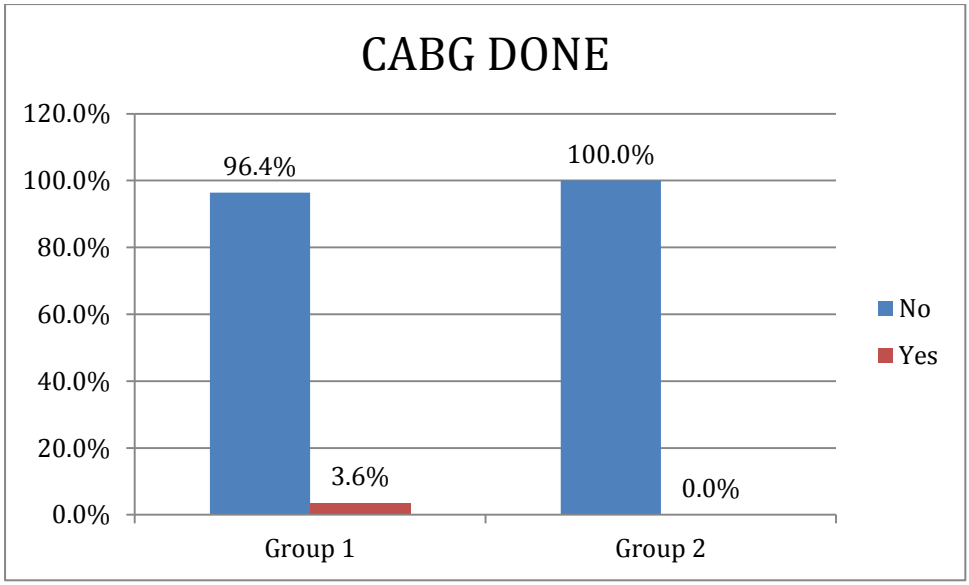

FIGURE 5: DISTRIBUTION OF PATIENTS BASED ON DIABETIC STATUS

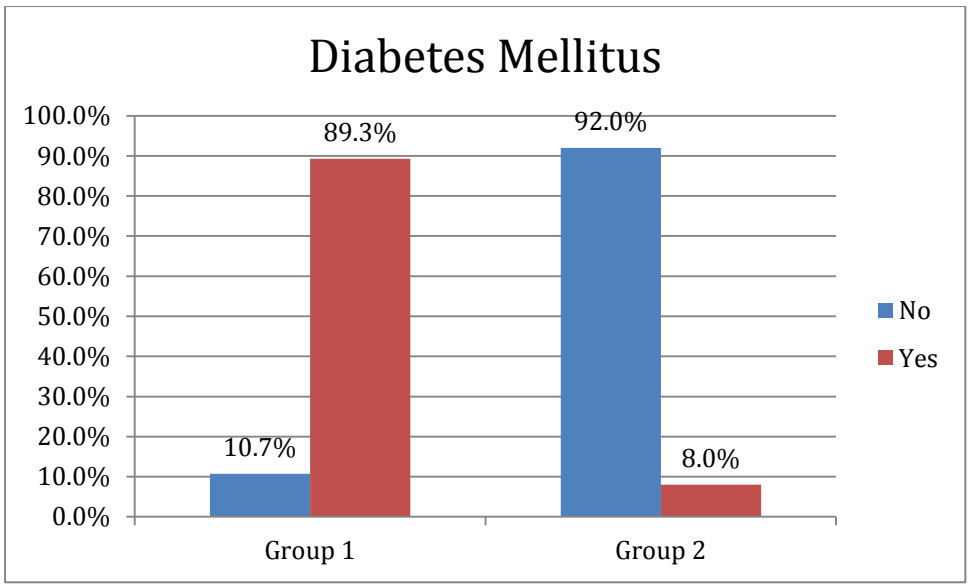

FIGURE 6: DISTRIBUTION OF PATIENTS BASED ON ECG CHANGES IN BOTH THE GROUPS

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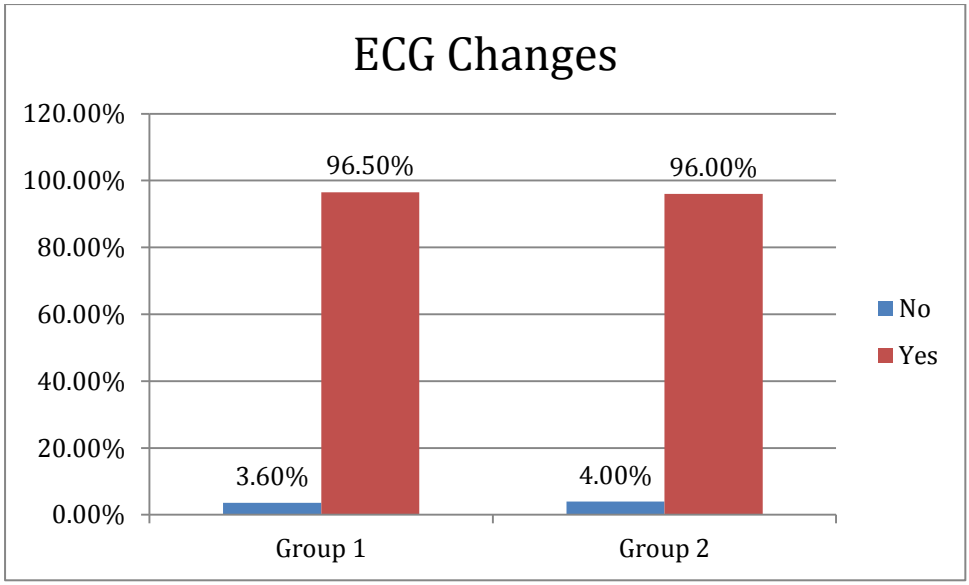

TABLE 1: CORRELATION OF PARAMETERS IN BOTH GROUPS

	STUDY GROUP Mean ± S.D (N=28)	CONTROL GROUP Mean ± S.D (N=25)	
Age	63.10 ± 13.77	57.32 ± 15.27	0.153
Body Mass Index	26.44 ± 2.39	26.01 ± 2.00	0.491
Systolic Blood Pressure	136.86 ± 26.51	132.37 ± 24.74	0.529
Diastolic Blood Pressure	85.35 ± 18.35	80.80 ± 14.11	0.320
PR	91.89 ± 20.90	85.96 ± 12.187	0.220
RR	21.35 ± 4.69	19.80 ± 3.97	0.201
Temperature	97.95 ± 0.64	97.97 ± 0.42	0.884
GRBS	254.46 ± 129.82	144.76 ± 60.33	**0.001**
FBS	192.53 ± 79.41	105.32 ± 12.31	**0.001**
PPSB	262.10 ± 85.10	122.480 ± 9.76	**0.001**
HBA1C	8.03 ± 1.78	4.91 ± 0 .58	**0.001**
HB	11.65 ± 1.89	12.66 ± 2.05	0.070
Blood Urea	37.25 ± 17.25	33.26 ± 23.65	0.483
Serum	1.18 ±1.04	1.184 ±2.007	0.998
GRACE2.0	122.32 ± 32.34	106.62 ± 25.50	0.057
eAG	183.84 ± 51.32	94.27 ±16.86	**0.001**
Risk	12.121 ±10.12	7.52 ± 6.66	0.059

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DISCUSSION: The mean age of study population is 63.10±13.77 years and the mean age of control population is 57.32±15.27 years, p-value-0.153 which is statistically insignificant. The mean BMI of study population is 26.44±2.39 and mean BMI of control group is 26.01±2.00, p-value is 0.491 which is statistically insignificant. This is in correlation with a study conducted by Cakmak et al, who observed that there is no significant correlation between age, BMI with blood glucose levels (1). The mean systolic blood pressure of study population was 136.86±26.51 and the mean blood pressure of control group is132.37±24.74 mm Hg, p- value is 0.529 which is statistically insignificant. The mean diastolic blood pressure of the study population was 85.35±18.35 mmHg and the mean diastolic blood pressure of control group is 80.80±14.11 mmHg, p-value is 0.320 which is statistically insignificant. The mean pulse rate of the study population is 91.89±20.90 and the mean pulse rate of control group is 85.96±12.187, p-value is0.220 which is statistically insignificant. The mean respiratory rate of study population is 21.35±4.69 and the mean respiratory rate of control group is 19.80±3.97, p-value is 0.201 which is statistically insignificant. The mean temperature of study population is 97.95±0.64°F and the temperature of the control group is 97.97±0. 42°F.The mean FBS of study population is 192.53±79.41 mg/dl and the mean FBS levels of the control group is 105.32±12.31 mg/dl, p-value is 0.001 which is statistically significant. The mean PPBS of study population is 262.10±85.10mg/dl and the mean PPBS levels of the control group is 122.480±9.76mg/dl, p-value is 0.001 which is statistically significant. The mean HBA1C of study population is 8.03±1.78mg/dl and the mean PPBS levels of the control group is 4.91±0.58mg/dl, p-value is 0.001 which is statistically significant. The mean GRACE 2.0 of study population is 122.32±32.34mg/dl and the mean PPBS levels of the control group is 106.62±25.50mg/dl, p-value is 0.057which is statistically insignificant. The mean eAGof study population is 183.84±51.32mg/dl and the mean PPBS levels of the control group is 94.27±16.86mg/dl, p-value is 0.001which is statistically significant. Previous studies revealed that the blood sugar levels are raised significantly in people with bad outcome of MI compared to those without diabetes which is in correlation with my study findings where there is significant relation between above mentioned parameters between study group and control group. Raised blood sugar levels for long duration results in end organ failure. There is a direct relationship between diabetes mellitus and cardiovascular diseases. Uncontrolled diabetes is due to insulin resistance which triggers inflammation and decreased insulin may result in accumulation of fat in tissues resulting in obesity and altered lipid profile. The mechanism of inflammation plays a key role in initiation and progression of atherosclerosis, i.e. from initial recruitment of circulating leukocytes into arterial wall till the plaque rupture. Due to variations in lifestyle patterns the prevalence of diabetes is also on trend, therefore reduction of CVD risk in this population is of great public health importance. So screening for cardiovascular abnormalities should always be done in high risk population

CONCLUSION: When we compare eAG (estimated average glucose) of patients with diabetes to non-diabetic patients it shows that the severity of myocardial infraction is more in diabetics compared to non-diabetics. eAG to risk and grace 2.0 scoring in general is statistically insignificant. So further studies are needed to be done prove its association.

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